

LISTING OF THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. - 10. (Canceled)

11. (Previously Presented) An optical amplification method for an optical transmission system including a plurality of first light sources for Raman amplification that amplify signal light transmitted in an optical transmission line and a plurality of second light sources for Raman amplification that are disposed at positions adjoining respective members of said plurality of first light sources for Raman amplification via said optical transmission line, comprising the steps of:

amplifying said signal light by said first light sources for Raman amplification;

transmitting said amplified signal light through said optical transmission line;

providing one or more spare pumping light sources only among said plurality of second light sources for Raman amplification, the number of said second light sources being less than the number of said first light sources, a number of said first light sources not having spare pumping light sources, interveningly positioned between two of said second light sources being determined by a permissible failure rate of the optical transmission system;

detecting a deteriorated state of said signal light amplified by one or more of said first sources for Raman amplification; and

restoring said deteriorated signal light to an un-deteriorated state by emitting spare pumping light from at least one of said spare pumping light sources,

said spare pumping light sources being operated only when required to restore deteriorated signal light.

12. (Original) An optical amplification method in an optical transmission system in accordance with claim 11, wherein:

responsive to a deteriorated state of said amplified signal light, said spare pumping light is emitted from said spare pumping light source so that the output level of said signal light becomes the same output level before said deterioration.

13. (Original) An optical amplification method in an optical transmission system in accordance with claim 11, wherein:

responsive to a deteriorated state of said amplified signal light, said spare pumping light is emitted from said spare pumping light source so that the gain wavelength characteristic of said signal light becomes the same gain wavelength characteristic before said deterioration.

14. (Original) An optical amplification method in an optical transmission system in accordance with claim 11, wherein:

said first and second light sources emit light at first and second wavelengths, and
at least one spare pumping light source is provided for each of said first and second wavelengths.

15. (Original) An optical amplification method in an optical transmission system in accordance with claim 11, wherein:

outputs from said pumping light source and said spare pumping light source are controlled by respective control circuits in said one or more first and second light sources for Raman amplification.

16. (Previously Presented) An optical amplification method for an optical transmission system including a plurality of first light sources for Raman amplification for amplifying signal light transmitted in an optical transmission line and a plurality of second light sources for Raman amplification for amplifying signal light transmitted in said optical transmission line, wherein ones of said plurality of second light sources for Raman amplification are disposed at positions adjoining respective members of said first light sources for Raman amplification, said method comprising the steps of:

amplifying said signal light at first and second wavelengths by at least one of the plurality of said first Raman amplifiers;

transmitting, by the at least one of the plurality of said first Raman amplifiers, said amplified signal light through said optical transmission line;

providing, only among said plurality of second light sources for Raman amplification, a first spare pumping light source operating at a first wavelength for Raman amplification, and a

second spare pumping light source operating at a said second wavelength for Raman amplification;

detecting a deteriorated state of said signal light in said optical transmission line at said first wavelength, and/or said second wavelength; and

restoring said deteriorated signal light to an un-deteriorated state by operating said first or second spare pumping light sources,

said first and second spare pumping light sources being operated only when required to restore deteriorated signal light at their respective operating wavelengths, a total number of said first light sources for Raman amplification and a total number of said second light sources for Raman amplification being determined by a permissible failure rate of the optical transmission system.